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(FILE 'HOME' ENTERED AT 10:02:32 ON 06 OCT 2005)

FILE 'CA' ENTERED AT 10:02:45 ON 06 OCT 2005

L1 37872 S SPIKE OR SPIKING OR SPIKED
L2 33737 S INTERNAL(2A) (STANDARD OR ISOTOP?)
L3 25307 S SOLUTION(2A) (STANDARD OR ISOTOP?)
L4 8246 S (STANDARD OR MULTIPLE) (2A) ADDITION
L5 9663 S L1-3(6A) (DILUT? OR ADD OR ADDING OR ADDED OR ADDITION OR INCLUD?
OR INCLUSION OR MIX OR INJECT? OR MIXING OR MIXED)
L6 355 S L4(6A) (DILUT? OR INCLUD? OR INCLUSION OR MIX OR INJECT? OR
MIXING OR MIXED)
L7 2847 S L1-4 AND(AUTOMAT? OR(COMPUTER OR PROCESSOR OR MICROPROCESSOR)
(3A) CONTROL?)
L8 6317 S L1-4 AND(ONLINE OR ONSTREAM OR INLINE OR INSTREAM OR "ON" LINE)
L9 536 S L1-4 AND(ONLINE OR ONSTREAM OR INLINE OR INSTREAM OR ON LINE)
(7A) (SAMPL? OR WITHDRAW? OR ASPIRAT?)
L10 128 S L7 AND L9
L11 150 S L9 AND MASS SPECTRO?
L12 1580 S L5-6 AND MASS SPECTRO?
L13 188195 S (PROCESS OR QUALITY OR BATH OR VAT OR TANK OR COMPOSITION OR
CONCENTRATION) (3A) CONTROL?
L14 204 S L5-6 AND L13
L15 62 S L12 AND L14
L16 130 S L8 AND L13
L17 187 S L12 AND L7-8
L18 680 S L10-11, L14-17
L19 594 S L18 NOT(AIR ANALYSIS OR ELECTROCHEM? OR FILTER MEDIA OR DIALYSIS
OR OFF LINE OR RAMAN)
L20 86 S L18 NOT L19
L21 14 S L20 AND(FERMENT? OR HEAVY METAL OR DIRECT SAMPL? OR BENTAZON OR
POS ION OR ELEMENTAL OR STANDARD DILUTION)
L22 538 S L19 NOT(INTRAVENOUS OR PREDICTIVE OR SPME OR DIODE OR
DESTRUCTIVE OR RADIOACTIVE OR POWDER OR DATA BASE OR ATOMIC
EMISSION)
L23 56 S L19 NOT L22
L24 12 S L23 AND(CLOSED LOOP OR STANDARD ADDITION OR IMPROVING/TI OR
STANDARDIZATION)
L25 460 S L22 NOT(BANDPASS OR FLAME OR FUNGAL OR ANTIBODY OR FUZZY OR
SERUM OR CLINKER OR X RAY OR NEOPLASM OR ASH)
L26 78 S L22 NOT L25
L27 18 S L26 AND(DIRECT INJECT? OR STANDARD ADDITION OR ROBOT? OR ISOTOPE
DILUTION LIQUID)
L28 366 S L25 NOT(LEMLI OR ROAD SAFETY OR CONTAMIN? OR METABOLITE OR
EXHAUST OR PCDD OR PRESERVATI? OR FIELD OR MYTH)
L29 94 S L25 NOT L28
L30 5 S L29 AND(SPECIES OR SPECIAL SAMPLE OR TWO STAGE)
L31 342 S L28 NOT(MICROELECTR? OR ELECTROTHERM? OR POTENTIOM? OR OPTICAL
EMISSION OR DNA OR COPOLYMERI? OR CHROMATOG? LABOR?)
L32 324 S L31 NOT(SEED OR BUBBLING OR COMPUTERIZED GAS OR PEONY OR
ATTENUATED OR CERAMIC OR DATING OR TITRATION OR PULP OR
POLLUTANT)
L33 18 S L31 NOT L32
L34 1 S L33 AND ISOTOPE DILUTION MASS/TI

L35 237 S L32 NOT PY>2001
 L36 1 S L32 AND PLATING
 L37 3 S L32 NOT L35 AND PATENT/DT
 L38 290 S L21,L24,L27,L30,L34-37
 L39 270 S L38 NOT(METEORITE OR SOLAR OR AGE OR AROMA OR OSMOTIC OR
 QUASMEME OR BASIN OR FOLATE OR SEDIMENT OR FILAMENT OR GLUCOSE)
 L40 20 S L38 NOT L39
 L41 1 S L40 AND FLOW SAMPLE INTRODUCTION
 L42 254 S L39 NOT(SAFEGUARD OR PERSISTENT OR RADIX OR ELECTROPHOR? OR HIGH
 STRENGTH OR CASTING OR ION BEAM)
 L43 16 S L39 NOT L42
 L44 1 S L43 AND FEEDBACK
 L45 256 S L41-42,L44

=> d bib,ab 1-256 145

L45 ANSWER 41 OF 256 CA COPYRIGHT 2005 ACS on STN
 AN 135:55091 CA
 TI Optimization of the technique of **standard additions** for inductively
 coupled plasma **mass spectrometry**
 AU Abbyad, Paul; Tromp, John; Lam, Joseph; Salin, Eric
 CS Department of Chemistry, McGill University, Montreal, QC, H3A 2K6, Can.
 SO Journal of Analytical Atomic Spectrometry (2001), 16(5), 464-469
 AB The use of **std. addns.** in the presence of instrument drift and the
 optimum size of the **added spike** relative to the unknown analyte concns.
 were studied for ICP-MS. In particular, a bracket approach, where the
spiked sample is measured between two different measurements of the
 sample, was studied. The av. of the two sample measurements is used in
 the **std. addns.** formula to est. concn. Several multi-element analyte
 solns. with single element matrixes (), were analyzed using both the
 bracket approach and regular **std. addns.** The bracket approach led to
 better results where drift was significant. In **addn.**, optimum **spike**
 size was studied. Simple models predict that detns. would be more
 precise with larger **spikes** if the instrument response was linear and
 relative std. deviation was const. These results show that while the
 use of larger **spikes** (from 7 to 50x the unknown concn.) did not yield
 the better precision predicted by the models, the precision was no worse
 than for **spikes** of size equal to the unknown concn. The Autonomous
 Instrument project is an approach to the **automation** of ICP-MS based on
 choosing an appropriate anal. calibration methodol. for an unknown
 sample. The method of **std. addns.** is the most accurate anal. methodol.
 considered by the Autonomous Instrument. These results have
 implications for the Autonomous Instrument, suggesting that bracket **std.**
addns. should be considered the best method, followed by regular **std.**
addns. In **addn.**, the **spike** size results imply that in **automatic** detn.,
 the long linear range of ICP-MS allows the **addn.** of large analyte **spikes**
 with minimal prior knowledge of the sample.

L45 ANSWER 54 OF 256 CA COPYRIGHT 2005 ACS on STN
 AN 134:75973 CA
 TI The verification of analytical ultrapure water instrumentation
 performance using an automated **standard dilution** apparatus
 AU Godec, Richard; Franklin, Karen

CS Sievers Instruments, Inc., A Subsidiary of Ionics, Inc., Boulder, CO,
80301, USA
SO Semiconductor Pure Water and Chemicals Conference (1999), 18th, 91-110
AB In the past 15 yr, improvements in industrial water purifn. and
measurement technologies have been driven by increasing high purity
requirements for Si wafer rinse water. The typical levels of impurities
of this water are often pushing or exceeding the limits of detection for
both **online** analyzers and off-**line** lab. analyzers. Anal. must often be
done using sample pre-concn. methods. Water collection methods for off
site anal. require great efforts to prevent sample contamination. Trace
level anal. can also be altered by sample matrix problems, instrument
recovery problems, or unstable instrument baselines and backgrounds.
Online instrumentation usually lacks built in **quality control** methods.
For these and other reasons it is often difficult for the water plant
operator to assess the accuracy of either **online** or off-**line** anal.
measurements. We have built a device that can be placed before an
analyzer to accurately add known trace levels of compds. to the
instrument sample stream. The method overcomes the limitations and
difficulties of prepg. low level stds. **Std. solns.** in the part per
million ranges of contaminants are prepd. in vials. The vial solns. are
dynamically dild. into the sample stream using a syringe pump. Dildn.
ratios 1:10,000-1:5,000,000 are easily achieved. This paper addresses
the principles of **std. addn.**, methods to evaluate analyzer suitability,
and provides an example of the use of this device to resolve a detector
problem at a semiconductor site.

L45 ANSWER 81 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 131:38885 CA

TI Optimal double and triple **spiking** for high precision lead isotopic
measurement

AU Galer, Stephen J. G.

CS Abteilung Geochemie, Max-Planck-Institut fur Chemie, Postfach 3060,
Mainz, D-55020, Germany

SO Chemical Geology (1999), 157(3-4), 255-274

AB Conventional lead isotope ratio measurements by thermal ionization **mass
spectrometry** (TIMS) are currently limited to external precisions of ~
0.1% (2 σ) due to variations in instrumental mass discrimination, the
magnitude of which can only be assessed using external std. or duplicate
measurements. The goal of the double-**spike** technique, by contrast, is
to circumvent this fractionation problem entirely by detg. the mass
discrimination factor ϵ directly for each sample. The unknown factor
can be obtained after performing a second measurement on a sample
aliquot to which a double **spike** of known, calibrated compn. has been
added. Practical applications of the double-**spike** technique up until
now have used a mixed ²⁰⁷Pb-²⁰⁴Pb tracer with considerable success, but
there appears to have been little or no attempt to optimize the compn.
of the tracer used. An optimal tracer compn. must fulfil two criteria:
(1) the ratio of the internal, measured errors to a posteriori errors-
the error magnification factors-should be as small as possible; (2) the
propagated errors should not be strongly influenced by the **spike**/sample
ratio of the second, mixt. run-the latter is important since sample size
cannot, in general, be rigorously controlled in advance. Of equal
importance to the tracer compn. itself is the choice of the three mass-

balance equation set used to solve for ϵ ; geometrically, this is equiv. to defining a mixing **line** in a particular 3D isotope space. Potential **spike** compns. were examd. in four such 3D isotope spaces, corresponding to cases where ^{208}Pb , ^{207}Pb , ^{206}Pb and ^{204}Pb in turn are common, denominator isotopes of the ratios on the three orthogonal axes. Within each isotope space there exist three possible double-**spike** families. Tracers composed of three stable isotopes of lead-so-called 'triple **spikes**'-are also considered, of which there are three families per isotope space. These **spike** compns. were evaluated for a typical common lead compn., at first using geometric methods, and then refined by detg. error magnification factors using an ion statistical error model. It is shown that the ^{207}Pb - ^{204}Pb double **spike** used in previous studies, where ϵ is detd. in $^{208}, ^{207}, ^{206}\text{Pb}/^{204}\text{Pb}$ isotope space, is one of the least suitable to use. Optimal tracer compns. for detg. ϵ appear to be restricted to two families: the first is a family of ^{207}Pb - ^{204}Pb - ^{206}Pb triple **spikes** with $^{207}\text{Pb}/^{204}\text{Pb}$ of around unity and the isotope space has ^{206}Pb as the denominator isotope; the second family consists of ^{204}Pb - ^{207}Pb double **spikes**, solved in $^{208}, ^{206}, ^{204}\text{Pb}/^{207}\text{Pb}$ isotope space. Both of these families yield error magnification factors on a posteriori, cor. $^{206}\text{Pb}/^{204}\text{Pb}$ ratios as low as ~ 1.2 , and are less than 2 for all but highly underspiked and overspiked mixt. compns.

$\alpha\beta\sigma$ L45 ANSWER 93 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 130:60255 CA

TI The CETAC ADX-500 autodiluter system: a study of dilution performance with the ELAN 6000 ICP-MS and ELAN software

AU May, Thomas W.; Wiedmeyer, Ray H.

CS Biological Resources Division, Columbia Environmental Research Center, U.S. Geological Survey, Columbia, MO, 65201, USA

SO Atomic Spectroscopy (1998), 19(5), 143-149

AB The CETAC ADX-500 autodiluter system was tested with ELAN v. 2.1 software and the ELAN 6000 ICP-MS instrument to det. **online automated diln.** performance during anal. of **std. solns.** contg. nine analytes representative of the mass spectral range (mass 9 to mass 238). Two or more diln. schemes were tested for each of 5 test tube designs. Diln. performance was detd. by comparison of analyte concn. means of dild. and nondild. stds. Accurate dilns. resulted with one syringe pump addn. of diluent in small diam. round-bottomed (13 mm OD) or conical-tipped (18 mm OD) tubes and one or more syringe pump addns. in large diam. (28 mm OD) conical-tipped tubes. Inadequate diln. mixing which produced high analyte concn. means was obsd. for all dilns. conducted in flat-bottomed tubes, and for **dilns.** requiring **multiple** syringe **addns.** of diluent in small diam. round-bottomed and conical tipped tubes. Effective mixing of dild. solns. depends largely upon tube diam. and liq. depth: smaller tube diams. and greater liq. depth resulted in ineffective mixing, whereas greater tube diam. and shallower liq. depth facilitated effective mixing. Two design changes for the autodiluter were suggested that would allow effective mixing to occur using any diln. scheme and tube design.

L45 ANSWER 99 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 129:117156 CA

TI Accurate determination of element species by online coupling of
chromatographic systems with ICP-MS using isotope dilution technique
AU Heumann, Klaus G.; Gallus, Stefan M.; Radlinger, Gunther; Vogl, Jochen
CS Institute of Inorganic and Analytical Chemistry, Johannes Gutenberg-
University Mainz, Mainz, D-55099, Germany
SO Spectrochimica Acta, Part B: Atomic Spectroscopy (1998), 53B(2), 273-287
AB The instrumental design for coupling different liq. chromatog. systems
such as ion, reversed phase, and size exclusion chromatog. as well as
capillary gas chromatog. with ICP-MS for the detn. of element species is
described. For accurate analyses obtaining 'real time' concns. of
chromatog. peaks, the isotope diln. **mass spectrometric** (IDMS) technique
is applied. Two different **spiking** modes are possible, one using
species-specific and another one using species-unspecific **spike solns.**
of **isotope**-enriched labeled compds. The species-specific mode is only
possible for element species well defined in their structure and compn.,
for example iodate or selenite, whereas the species-unspecific mode must
be applied in all cases where the structure and compn. of the species is
unknown, for example, for metal complexes with humic substances. For
accurate detns. by the isotope diln. technique the mass discrimination
effect must also be taken into account. Iodate, iodide and organoiodine
species, including those of humic substances, were analyzed in mineral,
drinking and environmental H₂O samples by coupling different liq.
chromatog. methods with ICP-IDMS. Heavy metal complexes with humic
substances in H₂O samples of different origin were characterized by size
exclusion/ICP-IDMS. The possibilities of detg. different environmental
Se species are discussed and the results for the anal. of selenite and
selenate, which was carried out by GC/ICP-IDMS after converting these
species into a volatile piasselenol compd., are presented.

L45 ANSWER 114 OF 256 CA COPYRIGHT 2005 ACS on STN
AN 127:238429 CA

TI Continuous process monitoring during anaerobic fermentation of
distillery wastewater using automatic analyzer systems. Part 1. GC
determination of fatty acid volatiles
AU Lantz, I.; Leopold, G.
CS Inst. Lebensmitteltechnologie Analytische Chemie, Techn. Univ. Munchen,
Freising, D-85350, Germany
SO Advances in Food Sciences (1997), 19(3/4), 81-86
AB An automatically working analyzing pilot plant consisting of different
structural parts, which were com. available, was constructed and tested.
The complex exptl. device consists of 3 sep. circuits for detn. of **diln.**
vols., **internal stds.**, and fermenter sample liq. The only moveable
parts were the plunger of the dosage system for GLC analyzer and the
solenoid valves. The valves controlled automatically the flow ways of
diln. and **internal std.** liqs. without a complicated and susceptible
regulation software. The mech. parts valves, sample loops were surface
mounted on a panel. All parts were changeable within a few minutes for
different anal. demands. Sample loops, glass vessels and dosage device
could be cleaned automatically. The exptl. plant was tested during 2 mo
in a continuous anaerobic fermn. of a highly liq. potato spent wash.
Anal. of fatty acids with the in-line GLC analyzer gave an excellent
reproducibility with a variation coeff. of $\leq 2.5\%$.

αβσL45 ANSWER 120 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 127:103617 CA

TI A study of random and systematic errors for the determination of molybdenum by inductively coupled plasma **mass spectrometry** using **online** isotope dilution analysis

AU Marchante-Gayon, J. M.; Garcia Alonso, J. I.; Sanz-Medel, A.

CS Dep. Phys. and Analytical Chemistry, Faculty Chemistry, Univ. Oviedo, Oviedo, 33006, Spain

SO Special Publication - Royal Society of Chemistry (1997), 202(Plasma Source Mass Spectrometry), 85-94

AB Reverse isotope diln. anal. was applied for the detn. of the concn. of a ⁹⁵Mo enriched **spike** and the procedure was **automatized** using an auto sampler where natural Mo stds. and **samples** were alternatively **mixed online** with the **spike** soln. A new equation is proposed for the **online mixing** of **samples** and **spike** using the autosampler. The measurement of a natural Mo std. between the samples makes possible to perform isotope diln. anal. referring the results to the natural Mo std. regardless of the concn. of the **spike**. The effects of both systematic and random errors were examd. and the error theory was applied for the accurate detn. of Mo in biol. materials by ID-ICP-MS.

αβσL45 ANSWER 122 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 127:70460 CA

TI **Online** Isotope Dilution Analysis with ICPMS Using Reverse Flow Injection

AU Beauchemin, Diane; Specht, August A.

CS Department of Chemistry, Queen's University, Kingston, ON, K7L 3N6, Can.

SO Analytical Chemistry (1997), 69(16), 3183-3187

AB A simple flow injection manifold is described to perform the **addn.** of isotopic **spikes** to aq. **samples online** with inductively coupled plasma **mass spectrometry** (ICPMS). The anal. involves one multielement **spike injection** in the sample carrier and another **injection** of the **spike soln.** in a **std.** carrier. This std. must contain one element which is not present in the **spike** soln., to allow the detn. of the dispersion coeff. The same std. also allows a reverse isotope diln. (ID) anal., in addn. to corrections for mass discrimination and any spectroscopic interference on one of the two isotopes used for the ID anal. This flow injection approach, therefore, requires only one isotope free of spectroscopic interference for elements whose isotopic distribution does not vary in nature (two isotopes are still needed for other elements since the "natural" ratio must then also be detd.). No preliminary anal. of the sample is required prior to the actual ID anal. Furthermore, the concn. profile resulting from the flow injection allows the selection of the best isotopic ratio in terms of error propagation. This approach, therefore, makes ID anal. as simple as an external calibration but with added accuracy and precision. It was successfully applied to the anal. of a river water certified ref. material and to saline water.

L45 ANSWER 127 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 126:170426 CA

TI **Online** measurement system based on biosensors

AU Jinghong, Han; Dafu, Cui; Yating, Li; Hao, Yu; Xingxia, Cai; Hong, Zhang

CS The State Key Laboratory of Transducer Technology, Institute of

Electronics, Chinese Academy of Sciences, Beijing, 100080, Peop. Rep. China

- SO Sensors and Actuators, B: Chemical (1996), B36(1-3, Proceedings of the Sixth International Meeting on Chemical Sensors, 1996), 422-426
- AB An **online** intelligent measurement system based on H⁺-ISFET and penicillinase FET is described. The system consists of a sampling system, a dilg. system, a liquor store, a monitoring cell, a series of tubing pumps for driving the sample, a testing circuit and a control circuit. The technol. of differential measurement, temp. and drift compensation as well as the calibration curve of the piece-wise fitting method are applied to the system. The measurement system can **control** a complete **process** of sampling, calibrating, cleaning, testing, and calcg. The **process** is **controlled** by a microprocessor. The real-time testing results based on H⁺-ISFET and penicillinase FET are presented. The testing results of a pH 6.86 buffer soln. during 15 h based on H⁺-ISFET are: the std. deviation = pH 0.008, the coeff. of variation = 0.1%. The correlation coeff. to test a series of buffer pH values is $r = 0.9999$, the anal. frequency = 60 samples per h. The results to test a series of penicillin **std. solns.** based on the penicillinase FET are: correlation coeff. = 0.9999, the test cycle is about 3 min. This system has been exptl. justified in a pharmacy factory.

$\alpha\beta$ L45 ANSWER 134 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 125:315489 CA

TI Determination of iodine using a **special sample** introduction system coupled to a double-focusing sector field inductively coupled plasma **mass spectrometer**

AU Kerl, Wolfgang; Becker, J. Sabine; Dietze, Hans-Joachim; Dannecker, Walter

CS Zentralabteilung Chem. Analysen, Forschungszentrum Juelich GmbH, Juelich, D-52425, Germany

SO Journal of Analytical Atomic Spectrometry (1996), 11(9), 723-726

AB A procedure for the detn. of iodine (esp. 129I) in biol. materials using double-focusing sector field **mass spectrometry** with an inductively coupled plasma ion source is described. To achieve a detection limit of less than 100 pg ml⁻¹ for 129I by double-focusing sector field ICP-MS an app. for introducing elemental iodine via the gas phase into the argon plasma is tested. The influence of the concn. of various oxidn. reagents for oxidizing iodide to iodine and matrix effects on the ion intensity of 129I⁺ and 127I⁺ are investigated. Quant. detn. of iodide is carried out by the **std. addns.** procedure and isotope **diln.** anal. The **online addn.** of **sample soln.** to an **isotopic** tracer **soln.** according to the flow **injection** principle has proved to be efficient. The procedure is discussed by detg. 127I as well as 129I in biol. std. ref. materials.

L45 ANSWER 137 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 125:179811 CA

TI **Online**, real time, continuous analytical and **closed loop control** of **process** solutions for electroplating using ICP chemistry

AU Waygood, J. B.

CS Trostre Works, British Steel Tinplate, UK

SO Proceedings of the Chemists' Conference (1995), 47th, 64-68

AB The process of continuously electroplating steel coil with either tin or

chromium, mainly for the canmaking industry, has gradually increased in speed. The strip is now processed through the various baths at speeds up to 600 m/min. Producing material at these speeds demands extremely close tolerances upon the various process solns. The authors have therefore developed an automated **online**, real time anal. system for these process solns. The system consists of: a large bore sampling pipeline network continuously delivering process solns. to the lab., an industrial robot for sampling and manipulating the samples and **std. solns.**, an autosampler/wash station for presenting samples to the spectrometer, a fully computerized ICP spectrometer for elemental anal. of the various process solns. Software, specially developed is used to: interface the robot to the sampling hardware and ICP, interface the ICP anal. results to the data management system and, where appropriate, achieve **closed loop control** of **process soln. concns.**, and introduce manual samples while carrying out routine automated anal. A full anal. of 12/13 process **lines** is achieved every 14 min, and restandardization is normally carried out automatically once every 8 h. Current routine maintenance of the system requires ~30 min per 24 h.

- L45 ANSWER 145 OF 256 CA COPYRIGHT 2005 ACS on STN
AN 124:277114 CA
TI Determination of Li by isotope dilution inductively coupled plasma **mass spectrometry**
AU Park, Chang J.; Chung, Bag S.
CS Korea Research Institute Standards and Science, Taejon, 305-600, S. Korea
SO Analytical Science & Technology (1995), 8(4), 427-34
AB Inductively coupled plasma **mass spectrometry** combined with the isotope diln. method was used for the detn. of Li. The isotope diln. method is based on the addn. of a known amt. of enriched isotope (**spike**) to a sample. The analyte concn. was obtained by measuring the altered isotope ratio. The **spike** soln. is calibrated through so called reverse isotope diln. with a primary std. The **spike** calibration is an important step to minimize error in the detd. concn. It was found essential to **add spike** to a sample and the primary std. so that the two isotope ratios should be as close as possible. Since Li is neither corrosive nor toxic, Li was used as a chem. tracer in the nuclear power plants to measure feedwater flow rate. 99.9% ⁷Li was injected into a feedwater **line** of an exptl. system and **sample** were taken downstream to be **spiked** with 95% ⁶Li for the isotope **diln.** measurements. Effects of uncertainties in the **spike** enrichment and isotope ratio measurement error at various **spike**-to-sample ratios are presented together with the flow rate measurement results in comparison with a vortex flow meter.
- L45 ANSWER 147 OF 256 CA COPYRIGHT 2005 ACS on STN
AN 124:218822 CA
TI Evaluation of a flow injection system combined with an inductively coupled plasma **mass spectrometer** with thermospray nebulization for the determination of trace levels of platinum
AU Parent, M.; Vanhoe, H.; Moens, L.; Dams, R.
CS Laboratory of Analytical Chemistry, Institute for Nuclear Sciences, Ghent University, Proeftuinstraat 86, Ghent, B-9000, Belg.
SO Analytica Chimica Acta (1996), 320(1), 1-10

AB The coupling of a flow injection system to an inductively coupled plasma **mass spectrometer** using thermospray nebulization for the detn. of Pt is evaluated. The results are compared with pneumatic nebulization. The flow injection system provides the possibility of **online sample diln.** and **online** standardization. A comparative study was made between **online isotope diln.**, **online std. addns.** and external calibration emphasizing accuracy, precision and flexibility of the method. Several parameters of thermospray and flow injection were evaluated. Sensitivity, background and detection limits were studied as well as the peak integration method to be used with the flow injection system. The detection limits, using flow injection (200 μ L loop) and partial integration of the peak, were in the range of 25 ng/l (5 pg abs.) and 8 ng/l (2 pg abs.) for pneumatic and thermospray nebulization, resp. The optimized procedure was used for the detn. of Pt in corn leaves, mouse liver and a $\text{Ca}_3(\text{PO}_4)_2$ matrix.

L45 ANSWER 154 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 123:283670 CA

TI Development of an extremely flexible automatic analyzer with integrated biosensors for **online control** of fermentation **processes**

AU Schuhmann, Wolfgang; Wohlschlaeger, Heidi; Huber, Johanna; Schmidt, Hanns-Ludwig; Stadler, Herbert

CS Lehrstuhl Allgemeine Chemie Biochemie, Technische Univ. Muenchen, Freising-Weihenstephan, 85350, Germany

SO Analytica Chimica Acta (1995), 315(1-2), 113-22

AB The development of a highly flexible sequential-injection system for the **online control** of fermn. **processes** is described. The developed system shows a significantly improved flexibility and adaptability to the needs of a particular fermn. process to be monitored as compared with conventional flow-injection systems. The no. of necessary hardware components was also drastically decreased, and the min. injection vol. decreased to 3-5 μ L, allowing improved diln. of an injected sample plug and improved mixing of coinjected reagents. A diln. factor can be adjusted to between 1 and 100 due to controlled dispersion of the injected sample plug within the tube system by choosing an appropriate injection vol. Due to the sym. design of the injection manifold and the versatile control software, complex injection profiles can be obtained that are necessary to coinject a sample together with a reagent or a sample together with 1 or 2 **std. solns.** for immediate recalibration. The system is fully automated, and the specially developed software package comprises automatic calibration and recalibration with ≤ 5 **std. solns.**, real-time calcn. of the actual concn. values based on the most recent calibration data, documentation of the fermn. course, and injection of samples from ≤ 4 sampling sites with variable time basis.

$\alpha\beta$ L45 ANSWER 166 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 121:101332 CA

TI Determination of lead by flow-injection inductively coupled plasma **mass spectrometry** comparing several calibration techniques

AU Goossens, Jan; Moens, Luc; Dams, Richard

CS Laboratory of Analytical Chemistry, Institute for Nuclear Sciences, Ghent University, Proeftuinstraat 86, Ghent, B-9000, Belg.

SO Analytica Chimica Acta (1994), 293(1-2), 171-81
AB In this paper the authors have evaluated the coupling of a modular flow-injection system to an inductively coupled plasma **mass spectrometer** for lead detns. by direct anal. of wines and urine samples. The flow-injection system used allows an **online sample diln.** and an **online addn.** of **internal std.** and calibrant **soln.** It was found that particular attention should be paid to the adjustment of the nebulizer gas flow rate in order to obtain max. sensitivity and precision. In this way and for the exptl. set-up described, R.S.D. values $\leq 1\%$ on the $^{208}\text{Pb}^+$ signal for 5 consecutive injections could readily be achieved. The relative merits of external calibration, **std. addns.** and isotope **diln.** for the calibration of the transient lead signals were compared. It appeared that from the viewpoint of accuracy, precision and flexibility, the **std. addns.** method is the most preferable procedure. Further, it was found that the precision of isotope ratio detns. is degraded in comparison to continuous nebulization. However, matrix-induced mass fractionation on the lead isotope ratios as obsd. for the continuous nebulization of an aq. ethanolic (wine) matrix did not occur in flow-injection anal. The quantitation of lead by direct anal. of undiluted wine and urine samples using this flow-**injection** method in combination with **std. addns.** calibration resulted in very accurate results (compared to certified and ref. values). Excellent relative std. deviations (for 5 consecutive detns.) were obtained ranging from 1% (50 $\mu\text{g/L}$ Pb in white wine) to 5% (3.6 $\mu\text{g/L}$ Pb in urine).

$\alpha\beta\sigma\text{L45}$ ANSWER 178 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 119:33989 CA

TI The use of an enriched isotope as an on-line **internal standard** in inductively coupled plasma **mass spectrometry**: a reference method for a proposed determination of tellurium in industrial waste water by means of graphite furnace atomic absorption spectrometry

AU Klinkenberg, Huub; Beeren, Ton; Van Borm, Werner; van der Linden, Fons; Raets, Mich

CS Dep. PAC, DSM Res., Geleen, 6160, Neth.

SO Spectrochimica Acta, Part B: Atomic Spectroscopy (1993), 48B(5), 649-61

AB The continuous addn. of a soln. of an enriched ^{125}Te as **internal std.** is used in an **online isotope diln.** inductively coupled plasma **mass spectrometry** (ID-ICP-MS) anal. for the detn. of Te in industrial wastewater. The method has the precision and accuracy attainable with isotope diln. In order to check for possible polyat. interferences, 2 analyte isotopes (^{128}Te and ^{130}Te) were used. Isotopic ratios were converted into calibration graphs that are curved for both analyte isotopes. A formula is presented, with which the shape of a calibration graph can be calcd. beforehand. ICP-MS has been used as a ref. method for a proposed graphite furnace at. absorption spectrometry (GFAAS) procedure that uses the combination of Pd, Triton X-100 and H as matrix modifier. Only Triton X-100 could assure the uniform atomization of Te. Obviously, the particle size distribution of Pd is much more important than the dispersion of Pd particles in the graphite furnace. Forty-eight wastewater samples were analyzed. The GFAAS and ICP-MS results were compared as paired samples using a t-test on their differences. At a confidence level of 0.05, both methods gave identical results.

L45 ANSWER 186 OF 256 CA COPYRIGHT 2005 ACS on STN
AN 117:123555 CA
TI Automatic calibration and dilution in unsegmented flow systems
AU Agudo, M.; Rios, A.; Valcarcel, M.
CS Dep. Anal. Chem., Univ. Cordoba, Cordoba, E-14004, Spain
SO Analytica Chimica Acta (1992), 264(2), 265-73
AB An open-closed flow system allowing variable vols. of **std.** calibration **soln.** to be introduced and automatically **dild.** was used to carry out automatic calibrations in unsegmented flow systems. A diln. loop was thus established in which its final homogenized vol. was used as dild. sample or calibrant soln. in the main flow system. The performance of the diln. loop was tested both in injection and in completely continuous flow systems and was found to be appropriate for anal. **process control.**

αβσL45 ANSWER 192 OF 256 CA COPYRIGHT 2005 ACS on STN
AN 115:125715 CA
TI **Automated spike** preparation system for Isotope Dilution Mass Spectrometry
AU Maxwell, Sherrod L., III; Clark, John P.
CS Westinghouse Savannah River Co., Aiken, SC, 29808, USA
SO Nuclear Materials Management (1990), 19, 199-202
AB Isotope Diln. **Mass Spectrometry** (IDMS) is a method frequently employed to measure dissolved, irradiated nuclear materials. An **automated spike** prepn. system was developed at the Savannah River Site (SRS) to dispense **spikes** for use in IDMS anal. methods. The new system employs a high precision SMI Model 300 Unipump dispenser interfaced with an electronic balance and a portable Epson HX-20 notebook computer to **automate spike** prepn. Using the computer to collect duplicate net wts. on a predetd. no. of **spike** containers, dispensing accuracy is confirmed by a statistically-based sampling plan. The d. of the **spike** soln., the vol. setting on the Unipump dispenser, and the calcd. net wts. of the **spikes**, the av. wt. of the **spikes** are calcd. along with the obsd. variance est. If the obsd. variance control limits, the **spikes** are released and treated as having equal quantities of the **spiked** isotope within the calcd. uncertainty est. This feature eliminates a whole layer of bookkeeping and the need to track individual **spike** containers and their individual quantities of the **spiked** isotope.

αβσL45 ANSWER 195 OF 256 CA COPYRIGHT 2005 ACS on STN
AN 115:40843 CA
TI On-line **standard additions** with direct injection nebulization for inductively coupled plasma **mass spectrometry**
AU Wiederin, Daniel R.; Smyczek, Ronald E.; Houk, R. S.
CS Dep. Chem., Iowa State Univ., Ames, IA, 50011, USA
SO Analytical Chemistry (1991), 63(15), 1626-31
AB A flow **injection** method for **online std. addns.** for inductively coupled plasma **mass spectrometry** is described. A 500-μL sample soln. is injected into a flowing stream via a metal-free flow injection valve. **Std. solns.** (50 μL) are sequentially introduced through a second valve. The two streams mix in a PEEK tee before they are nebulized into the ICP. The advantages of the method of **std. addns.** for matrix correction

are retained, but the time-consuming soln. prepn. steps for conventional **std. addns.** are eliminated by using flow **injection** techniques and a direct injection nebulizer. Nine toxic elements in undiluted urine were detd. in less than 5 min. Possible effects of sample viscosity on accuracy are investigated. Evidence for a change in the background when seawater is nebulized is also presented.

αβσL45 ANSWER 196 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 114:258669 CA

TI **Online** automated analysis of **plating** baths using inductively coupled plasma (ICP)

AU Dohi, Kazunobu; Wada, Atsuo; Nakamura, Shouji

CS Kobe Steel, Ltd., Kobe, Japan

SO R&D, Research and Development (Kobe Steel Ltd.) (1991), 41(1), 146

LA Japanese

AB An automated system was developed for the detn. of elements in Fe **plating** bath contg. Fe as a major element and microamt. of Ni. The system was composed of equipment for pretreatment (such as filtration and diln.) of the **plating** bath and an inductively coupled plasma (ICP) for the detn. of the compn. of the **plating baths** which were **controlled** by a microcomputer. A **std. soln.** of Y was **added** and by monitoring the intensity of luminescence and the detn. of std. samples, the accuracy of the detd. values is improved. By the use of ICP, ppm level of elements could be detd.

αβσL45 ANSWER 199 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 112:228753 CA

TI On-line isotope dilution and **sample** dilution by flow injection and inductively coupled plasma **mass spectrometry**

AU Viczian, Miklos; Lasztity, Alexandra; Wang, Xioaru; Barnes, Ramon M.

CS Dep. Chem., Univ. Massachusetts, Amherst, MA, 01003-0035, USA

SO Journal of Analytical Atomic Spectrometry (1990), 5(2), 125-33

AB A systematic investigation was made to demonstrate the applicability of a flow injection system for **online** isotope diln. and **online sample** diln., as obtained by merging the **sample** soln. with the **spike** soln. or with the diluent, resp. The effect of the sample to **spike** ratio on the precision and accuracy was examd., and the advantages and limitations of the proposed technique are demonstrated.

αβσL45 ANSWER 212 OF 256 CA COPYRIGHT 2005 ACS on STN

AN 105:126349 CA

TI **Automatic** titration apparatus for **isotope dilution mass** spectral analysis

IN Ezawa, Naoya; Kato, Yutaka; Takada, Koichi; Kunikata, Michio; Kawamura, Hironobu

PA Hitachi, Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 3 pp.

PI JP 61013153 A2 19860121 JP 1984-133193 19840629

PRAI JP 1984-133193 19840629

AB An **automatic** titrn. app. is claimed which has controls to regulate the **spiking** of a sample during isotope **diln.** mass spectral anal. By **automating** the **spiking** process, a large no. of samples differing in

isotopic compn. can be analyzed.

=> log y

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